

## *The NASA Energy and Water cycle Study Science Integration Team*

Report of Project Progress to NASA-MSFC Grant Office, February 7, 2007

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### **Project Objectives**

The NASA earth science research program has established the NASA Water and Energy Cycle Focus Area (WECFA) with an integrating NASA Energy and Water cycle Study (NEWS) that has the overarching long-term grand challenge to ***document and enable improved, observationally-based, predictions of water and energy cycle consequences of Earth system variability and change.*** Pursuant to the overall NASA goal of understanding the Earth system and applying Earth system science to improving the prediction of climate, weather and related natural hazards, the Associate Administrator for Earth Science established a NASA Energy and Water cycle Study (NEWS) Science Integration Team (NSIT). The NSIT will address all elements of energy and water cycle research and associated technology requirements and mission development, and provide a liaison with the other ESE research focus areas. The NSIT will serve as an interface to NASA system components, and to coordinate and integrate the results of the NEWS product- and discovery-driven investigations. NEWS will comprise a balance of product-driven and discovery-driven investigations that will be focused and served by the NSIT. Therefore, this proposal seeks to establish the resources needed by the NASA Science Integration Team to carry out these responsibilities to include (1) **NEWS science integration** (i.e. data integration, linkage building, crosscutting science, etc.), (2) **NEWS science gap filling** (doing science that must be done, but was not proposed and/or funded), and (3) **NEWS administration** (i.e. NEWS planning, POC responsibilities, Implementation Plan updates, etc.).

### **Tasks and Schedule**

Specific NSIT responsibilities include:

#### **(1) NEWS science integration**

- Data product integration
- PI coordination
- Linkages to NASA system components
- Interdisciplinary science

#### **(2) NEWS science gap filling**

- Doing science that must be done, but was not proposed and/or funded

#### **(3) NEWS administration**

- Organize meetings
- NEWS planning & vision
- POC responsibilities
- Implementation plan updates
- Representing NEWS to national and international partners

The following tasks were conducted to achieve the above project responsibilities

#### **NEWS Science Gap Filling:**

- Officially identified NEWS tasks/gaps and mapped them to against each phase in the Implementation Plan.
- Identified potential NSIT gap filling opportunities
- Identified potential partner links to fill gaps

The NEWS ROSES 2005 call sought to cover the following areas that addressed the following gaps:

1. Development of long-term regional merged aerosol and cloud vertical distribution products
2. Investigations of polar/high-latitude water and energy cycle budgets and fluxes
3. Development of advanced multi-instrument and multivariate radiation transfer models to simultaneously retrieve land, ocean, and atmosphere water and energy information
4. Investigations that employ novel methods with advanced statistical analyses to quantify and diagnose observed predictability in the global water and energy cycle and corresponding model fidelity and capability.

The newly awarded WaterNet Solutions Network project filled the void for Applications tasks by connecting water cycle research to practical applications

Recently POC led projects have gotten underway. Clear goals and players have been identified and outline of plans completed.

#### **NEWS Administration:**

Communication continued throughout the year between POCs and selected PI's to ensure projects were on task and money was being used effectively. All required progress reports were submitted on time. Regularly scheduled telecons support NSIT coordination in completing action items to move projects forward and serve as a mechanism to coordinate and communicate between NASA management and NEWS PI investigations. Periodic highlights are provided to NASA program managers to show progress.

The NEWS website serves as a creative environment for facilitating future development and maintenance for NEWS projects.

#### **NEWS vision and planning of two major events:**

- March 15-17, 2006: NEWS ROSES panel review meeting

Planning began with the selection of NEWS reviewers and panelist, determining conflicts and defining the logistics and agenda for the panel review.

After a successful panel review, top proposals were selected.

Selections from ROSES/NEWS 2005 include:

PI: Xiquan Dong, Univ. N. Dakota – POC: R. Schiffer

PI: Yongxing Hu, NASA/Langley - POC: W. Rossow

PI: Dennis Lettenmaier, Univ. WA – POC: R. Houser

PI: Sally McFarlane, PNNL – POC: R. Schiffer

PI: Duane Waliser, JPL – POC: C. A. Schlosser

- September 26-28, 2006: NEWS 2<sup>nd</sup> PI meeting

PI annual progress reports were submitted before the 2<sup>nd</sup> PI meeting. POCs requested that PIs report their connections/interactions (what they may need from other projects), problems/concerns and overall progress. POCs were then urged to take action on reports.

The focus of the 2<sup>nd</sup> PI meeting was on coordination and integration; team building and answering the question: Are we on track to do what we proposed to do? Representatives from interagency water cycle groups such as CPPA, NCAR, DOE, etc. were invited. Prediction was the theme for the meeting.

An overall NEWS presentation was given highlighting results from each project, along with a presentation on the NEWS Implementation Plan.

NSIT member Bill Lapenta presented the NEWS modeling framework to show how NEWS interacts with other parts within NASA. In the Modeling Predication Strategy breakout session it was agreed that clearly defined metrics were needed. The metrics needed to be stated in PI reports; a good way to spot deficiencies. The NSIT has spent considerable time defining the modeling section in the Implementation Plan.

Overall, the 2<sup>nd</sup> PI meeting served as a good opportunity to represent NEWS to interagency partners.

### Data Product Integration

Planning for the NEWS Data Integration Center (NDIC) began immediately after the September PI meeting. Considerable work was done to define content, layout and accessibility for the site, and inputs from PIs and POCs were valued. A Data Policy was crafted and added as an appendix to the Implementation Plan. The NDIC is now open for user input and is hosted on NEWS website. This center also serves a link to NASA system components and fosters interdisciplinary science coordination. The NIST continues to encourage NEWS members to use this facility.

### NEWS Documents

Schlosser, C.A., P. Houser, 2006, "Assessing a Satellite-Era Perspective of the Global Water Cycle", *J. Climate*, in press.

- Final Draft of NEWS Implementation Plan Executive Summary sent to Program Manager
- Revision and update of NEWS Implementation Plan, a living document. Posted on NEWS website
- New Data Integration Policy included in Implementation Plan

### NEWS Outreach

Houser, P., D Belvedere, B IMAM, R Schiffer, C Schlosser, H Gupta, C Welty, C Vörösmarty, D Matthews, R Lawford, 2006. The Water Cycle Solutions Network, IN32A-04, *American Geophysical Union* Fall Meeting, San Francisco CA, December 11-15, 2006, ORAL presentation

Houser, P., J. Entin, W. Rossow, W. Lapenta, B. Lin, E.. Njoku, C. Schlosser, R. Schiffer, 2006: **GPM and the NASA Energy and Water cycle Study**, 6<sup>th</sup> GPM International Planning Workshop, 6-8 November 2006, Annapolis, Maryland.

Entin, J., Houser, P. W. Rossow, W. Lapenta, B. Lin, E.. Njoku, C. Schlosser, R. Schiffer, 2006: **The NASA Energy and Water cycle Study (NEWS)**, Second 2006 LCLUC Science Team Meeting, focusing on the water cycle, October 10-12, 2006, College Park, MD.

Houser, P., J. Entin, W. Rossow, W. Lapenta, B. Lin, E.. Njoku, C. Schlosser, R. Schiffer, 2006: **NASA and the NEWS (NASA Energy and Water) Program**, First Pan-GEWEX Meeting, ESRIN, Frascati, Italy, 9-13 October 2006

Houser, P., 2006: **Satellite Data Working Group: The NEWS Data Integration Center**, First Pan-GEWEX Meeting, ESRIN, Frascati, Italy, 9-13 October 2006.

Houser, P., 2006: **Overview of the NEWS program**, 2nd NASA Energy and Water cycle Study NEWS PI Meeting; University of Maryland Inn & Conference Center; September 26-28, 2006.

Houser, P., D. Belvedere, B. Imam, R. Schiffer, C.A. Schosser, H. Gupta, C. Welty, C. Vorosmary, D. Matthews, R. Lawford  
2006: WaterNet: The NASA Water Cycle Solutions Network; 2nd NASA Energy and Water cycle Study NEWS PI Meeting; University  
of Maryland Inn & Conference Center; September 26-28, 2006.

Houser, P., and C. Larko, 2006: NEWS Data Integration Center, 2nd NASA Energy and Water cycle Study NEWS PI Meeting;  
University of Maryland Inn & Conference Center; September 26-28, 2006.

Houser, P., D. Belvedere, B. Imam, R. Schiffer, C.A. Schosser, H. Gupta, C. Welty, C. Vorosmary, D. Matthews, R. Lawford,  
2006. WaterNet: The NASA Water Cycle Solutions Network, NASA Applied Science Program; Water Management Program  
Workshop, UMUC Conference Center, June 13, 2006.

Belvedere, D.R., Houser, P.R. Imam, B., Schiffer, R., Schlosser, C.A., Gupta, H.V., Welty, C., Vorosmarty, C., Matthews, D.,  
Lawford, R., 2006. WaterNet: The NASA Water Cycle Solutions Network. Eos Trans. AGU, 87(36), Jt. Assem. Suppl. Abstract H43B-  
09.

Houser, P., D. Belvedere, B. Imam, R. Schiffer, C.A. Schosser, H. Gupta, C. Welty, C. Vorosmary, D. Matthews, R. Lawford,  
2006. WaterNet: The NASA Water Cycle Solutions Network, AGU Joint Assembly, Baltimore, MD, May 23-26, 2006, Poster.

Houser, P., D. Belvedere, B. Imam, R. Schiffer, C.A. Schosser, H. Gupta, C. Welty, C. Vorosmary, D. Matthews, R. Lawford,  
2006. WaterNet: The NASA Water Cycle Solutions Network, 17<sup>th</sup> ESIP Federation Meeting, Palisades, NY, July 18-21, 2006, Poster.

Houser, P., D. Belvedere, B. Imam, R. Schiffer, C.A. Schosser, H. Gupta, C. Welty, C. Vorosmary, D. Matthews, R. Lawford,  
2006. WaterNet: The NASA Water Cycle Solutions Network, NASA Biodiversity, Terrestrial Ecology, and Related Applied Sciences,  
University of Maryland Inn & Conference Center, August 21-25, 2006, Poster.

Additional presentations, not listed above, have been given by other NSIT members